



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

DATE: January 20, 1993

SUBJECT: Preliminary Review of the East Well Aquifer Pumping Test Report at the Carrier Air Conditioner NPL Site, Collerville, Tennessee

FROM: Lee Thomas, Hydrologist
Ground Water Technology Support Unit

LT

TO: Beth Brown, Remedial Project Manager
North Superfund Remedial Branch

A preliminary review has been conducted of the East Well Aquifer Pumping Test at the Carrier Air Conditioner NPL Site located in Collerville, Tennessee as requested in your December 30, 1992 memorandum to Lee Thomas. The review is preliminary due to the current work load in the Ground Water Technology Support Unit (GWTSU) and due to some of the information that would be useful in the evaluation of the report being missing from the report. In general, it appears that the test was conducted properly and the results were analyzed accurately although some questions remain. Our only major disagreement with the report is in the conclusion that this test demonstrates that the water supply wells are adequate for remediation at this site. If these wells are used as envisioned, it would result in additional contamination being introduced into the Memphis sand from the overlying surficial aquifer in the area of the pinch out of the unnamed clay. We continue to believe that additional contamination should be prevented from entering the Memphis Sand.

Aquifer Testing

The East Well and the West Well were used in the testing of the aquifer properties of the Memphis Sand in a series of tests conducted in September and October 1992. In general, the testing appears to have been successful. We note that Carrier was not able to conduct the test at the discharge rate of 1000 gpm as originally slated and testing was instead conducted at a rate of 800 gpm due to technical problems.

Several monitoring wells were "hand monitored". We are not sure what this technique entails since it was not in the work plan but this is likely to be considerable less accurate than the use of data loggers as were used on the other monitoring wells. It appears that the wells for which this technique was used were wells in the overlying surficial aquifer. Data from this aquifer is



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needed to assess the "leakance" across this aquifer. Unfortunately this requires more sensitive data that can probably be acquired by "hand monitoring."

Test Analysis

There are some questions concerning the analysis of data from the tests. The test wells partially penetrate the Memphis Sand. Normally, partially penetrating wells result in vertical flow in the portions of the aquifer which are not immediately adjacent to the well screens. This vertical flow will result in additional head change beyond that produced by the horizontal flow into the well. If this vertical flow is not considered as the data is analyzed, it may result in inaccurate aquifer parameters being calculated. Reanalyze data incorporating vertical flow.

Section 7.1 discusses the barometric pressure changes that occurred during the test. Carrier used a 70% correction factor but does not explain the basis for the calculation of this factor or why it was used only to correct half the well data. The literature cited in this section may help answer some of these concerns but it could not be obtained in the time frame allowed for this review. Normally the correction factor is computed based on measurements of pressure and well water level fluctuations at a time separate from the tests. This section should be rewritten to explain what occurred.

The discussion on the well drawdown near the pinch out of the unnamed clay is contradictory. It appears to indicate that drawdown stabilized in the second sentence in Section 7.1 while in the fourth sentence it indicates at the same time that drawdown continues to increase. This section should be rewritten to clarify what was type of analysis was conducted on this data.

Creek-Aquifer Interconnection

Section 8.4 discusses the hydraulic interconnection of the Memphis Sand Aquifer and Nonconnah Creek. The report should indicate how, when, and where the creek stage was measured. In addition the data from this testing should be presented.

Aquifer Modeling

Aquifer modeling was presented in Section 9.2 to demonstrate the dimensions of the capture zone from two extraction wells. It would be helpful to the reviewer if the all the parameters used in the modeling were included in the explanation of the testing. One critical parameter that is not presented for the modeling is the length of the test run of the model. We recommend that the RESSQC data files be included in the report so that the modeling that was

conducted could be understood.

Conclusions

The conclusion that was reached as a result of this testing is that no more wells will be required than the two existing water supply wells for the extraction system of this site. At best such a conclusion is premature since the location of extraction wells is not generally decided until the remedial design phase. However, in this situation Carrier has already agreed to install a barrier system at the pinch out of the unnamed clay for the purpose of preventing additional migration of contaminated ground water from the surficial aquifer above the unnamed clay into the Memphis Sand. The use of the water supply wells for this purpose will cause additional contamination to enter the Memphis Sand and be transported across it to the water supply wells. Such a scheme may result in the increased contamination of the Memphis Sands in the vicinity of the clay pinch out and is unacceptable.

Hopefully these comments will be useful as you review this aquifer testing. If there are any questions please contact me at x3866.

CC: Beverly Houston